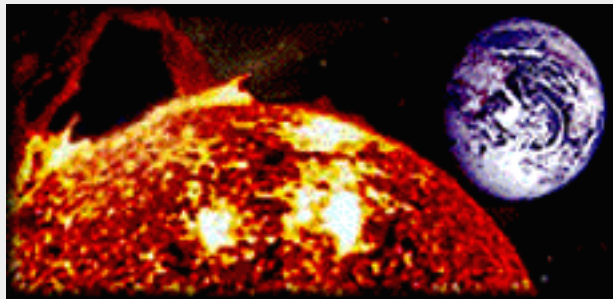


LASSO

Los Alamos

Space Science Outreach



A Teaching/Learning Enhancement Program
for
New Mexico Science and Math Teachers (K-12)

Sponsored by
Los Alamos National Laboratory
and the
National Aeronautics and Space Administration
(NASA)

Application Packet

Call for Applicants

The Science Education Team of Los Alamos National Laboratory is committed to the improvement of science education throughout the State of New Mexico. Through a variety of enhancement programs, we have helped students and teachers increase not only their science content knowledge, but also their critical thinking and problem solving skills.

We invite you to apply for participation in the educational component of the Los Alamos Space Science Outreach (LASSO) program, featuring on-going NASA projects that include Los Alamos National Laboratory science instrumentation and personnel. The educational component for the combined projects includes a teacher enhancement program that involves teachers from the K-12 levels in the process of designing on-line curriculum and the development of a museum display that focuses on space physics. Built around multiple space science projects, participant teachers will research and examine the issues and sciences involved in these complex projects. They will research and examine sciences involved in exploring the Solar System, interact with Los Alamos National Laboratory personnel and participate in the development of grade level appropriate curriculum for distribution via the World Wide Web. This program is a collaborative effort between the Science Education Team, the space science groups of Los Alamos National Laboratory and the National Aeronautical and Space Administration.

Selected teachers will be involved in a 2-day academic year workshop, May 11-12, a 9-day summer institute (July 10 – July 20), followed by a 3-day culminating workshop August 9-11 (stipend and housing will be arranged for the summer and culminating workshops). All workshops will be held at Los Alamos National Laboratory. We ask that the represented school sites support selected teachers by providing release time to attend LASSO in-service workshops and collaboration sessions.

We see this as an exciting opportunity for dedicated teachers to work collaboratively in the development of new skills that can expand their horizons. Although the focus for the LASSO project is on science teaching and content, we are accepting applications from any interested teacher committed to enhancing the educational opportunities of their students through science topics.

Please complete the application form in the enclosed packet and return to our office no later than April 7, 2000. Ten participating teachers (K-12) will be selected based on criteria listed in the application forms (additional teachers may be added as extra projects are added to the program). Expectations and responsibilities for participation are listed in the application materials. Selected participants will be notified by April 21, 2000 and will be expected to attend the introductory workshop, May 11-12, 2000.

If you have any questions or concerns, please feel free to contact me at (505) 667-1919, or by email at alexander_rick@lanl.gov. To see examples of previous work, check out the LASSO web site at <http://set.lanl.gov/programs/lasso/lassomain.htm>.

Sincerely,

Richard Alexander
Science Education Team
Los Alamos National Laboratory
PO Box 1663 MS M706
Los Alamos, NM 87545

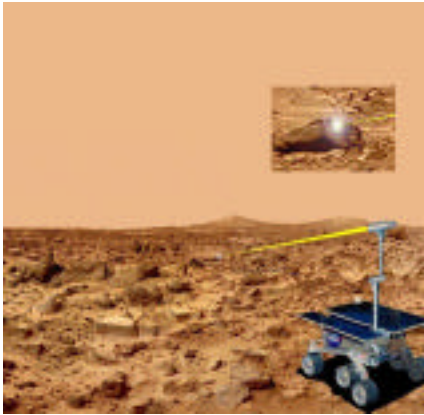
voice 505-667-1919
fax 505-665-4093
e-mail alexander_rick@lanl.gov

Los Alamos Space Science Outreach Project

NASA Space Physics Missions

Background

The Earth is constantly bombarded with high speed particles coming not only from the sun, but also from outside of the solar system. A number of NASA projects are designed to study these energetic particles to help us understand the origin, composition, and evolution of our solar system and the universe.



The **ACE** project will study the composition of several sources of matter in the Solar System, including the solar wind.

The **GENESIS** project will also collect solar wind particles to determine the elemental and isotopic composition of the Sun.

The **TWINS** project will allow scientists to “see” the whole magnetosphere and will give us a picture of how its different parts interact.

The **Lunar Prospector** project has led to the exciting discovery of water on the moon. Future endeavours will help to redefine our understanding of the moons composition and origin.

The **Fenton Hill Observatory** project was created to study Transient Astronomical sources. Transient phenomena in the cosmos present some of the greatest challenges to our understanding of Nature, and to our ability to extract information from data.

The **LIBS** instrument we are developing uses laser pulses focussed on a rock some distance away to produce a spark on the surface of the rock. The light from the spark is collected and its optical spectrum is analyzed to tell us what elements are present in the rock, and their relative abundance.

Information learned from these projects will help scientists better understand phenomena such as solar flares, the auroras, and communication disruptions. Project results will help us design better warning system for encroaching geomagnetic storms that not only disrupt communications, but are hazardous to astronauts and can cause pipeline corrosion.

Who among us has not asked, “Where did I come from?”

This question is usually one about life, but behind it are scientific questions about the material of which we are made, the elements in the atoms and molecules of our bodies. The answer to the question “Where did the matter we are made of come from?” is not so easy to find. Some could be satisfied with an answer such as “We are made of the same elements that are found on the Earth we live on.” But where did that material come from? The Earth

is but one planet in the solar system, and most of the solar system material is inside the Sun.

How can we find out what the Sun is made of? Where did the Sun come from?

One can even go further and ask, “What is the galaxy made of?” There is a whole series of related questions that are involved in understanding the cycles the matter goes through as the universe and the structures within it evolve.

Science has barely scratched the surface in examining the actual source of the particles traveling through space around us. The mix of particles that the NASA projects will measure is the result of a complex history. The ability of our space craft instruments to measure a wide range of particle types and energies at the same time and location, is what will enable scientists to separate the many processes the matter has undergone on its way to the Earth.

The prime purpose of the NASA projects is to study the composition of several distinct sources of matter; the Sun and solar system, the local interstellar space, and the galaxy as a whole. This, in turn, will lead us to a better understanding of the origin of the elements, and the subsequent evolutionary processing of matter (how it has changed since it was created). Along the way, we will learn more about particle acceleration and transport in the universe, and information needed to separate the changes in composition during the

particles' travel. Learning the differences in composition between the solar wind and the Sun will help answer questions about how the solar corona is formed and how solar wind is accelerated. Solar wind particles will also help us compare the compositions of the other planets. Examining the interactions of the magnetosphere parts will help us learn to protect our power systems and communication satellites. All of these interesting problems are part of the larger question "Where did we come from?" Results from the NASA project are only a small piece of an enormous puzzle.

As new information becomes available, from both spacecraft and Earth-based instruments, the picture becomes clearer. Theories are upheld or upset, and new theories take their place. NASA provides an abundance of information to further our understanding of the way our solar system, galaxy, and universe were created and how they continue to evolve.

Science is more than a body of knowledge and a way of accumulating and validating that knowledge. It is also a social activity that incorporates certain human values. Students should experience science as a process for extending understanding, not as unalterable truth.

(Rutherford and Ahlgren, Science for all Americans).

The Science Education Team of LANL has designed the LASSO project for teachers to focus on the topic of current solar system exploration, and will involve teachers in examining this matter of scientific importance. Participant teachers will acquire current scientific knowledge along with effective science instructional methodology to be used in the development and publication of on-line science education lessons and activities.

An introductory packet of information will be available for selected teachers. Specific instructions on how to develop an effective curriculum team, how to access resources and research the topic, how to develop telecommunication skills, and how to create effective web-based lessons will be explored at workshops for selected teachers.

Participant teachers will:

- gain new technology skills (use of telecommunications, HTML, web-page design, scanning, data collection and interpretation, development of spreadsheets and data bases, Internet research, etc.)
- develop and enhance instructional skills,
- expand their scientific knowledge base through exploration and collaboration, and
- create useful and intriguing classroom lessons and activities.

Expectations for Participation in LASSO project

These expectations will be used in the application and selection process. Evidence of participants meeting expectations will be evaluated during site-visits by the LASSO education program coordinator.

1. Computer workstation with Internet access (at school or at home)
2. Provision for teacher to have
 - Phone and Fax access at school
 - E-mail access (at school or at home)
3. Base level of software knowledge (word processing, spreadsheet, etc.)
4. Administrative support
 - time provided for workshop
 - Provision for teachers to implement their LASSO experience in the classrooms
5. Provide evaluation data as requested



Accountability Checkpoints for LASSO project

Each participating teacher will be responsible to demonstrate evidence for the following:

1. Completion of all assignments
2. Attendance at all workshops
3. Evidence of meeting all expectations
4. Maintenance of individual journals and portfolios
 - journals - daily entries; handwritten and electronic

Responsibilities of Participants in LASSO project

The Science Education Team is responsible for planning and implementing the program. Program coordinator will monitor the progress of the program, provide support and appropriate instruction.

The LASSO project is comprised of four (4) components. Each component will assume certain responsibilities. These components and their responsibilities are:

1. LANL personnel (scientists and technicians involved in the program)
 - provide a minimum of 2 hours per workshop to LASSO project including time for planning, communication, delivery of material, etc.
 - provide pertinent information to the participant research teams
 - provide feedback to participant questions
 - act as an electronic mentor for participant research teams
 - participate in the planning and/or delivery of a workshop component
 - work with participants as needed
2. Teachers
 - provide pertinent instruction in a classroom setting subsequent to the program
 - meet assignment deadlines and complete all projects
 - attend all workshops
 - provide pertinent evaluation data
 - maintain a personal journal
3. Administrators
 - support the LASSO project and participating teacher
 - provide teacher the opportunity and support to expand the LASSO experience in subsequent courses
4. Schools
 - provide teacher appropriate access to phones, fax and e-mail
 - provide teacher computer access/work station
 - provide teacher internet access (appropriate connections - phone lines, T-1 lines, etc.)
 - provide teacher with needed equipment (within budgetary constraints)

TEACHER/ADMINISTRATOR APPLICATION FORM

Los Alamos Space Science Outreach Project
Los Alamos National Laboratory / NASA

****All parts must be completed by teacher and administrator for consideration****

SECTION A - TEACHER

SECTION IA: Demographic information

TEACHER NAME _____		
HOME ADDRESS _____	CITY _____	ZIP _____
HOME PHONE NUMBER _____		
SCHOOL NAME _____	SCHOOL DISTRICT _____	
SCHOOL ADDRESS _____	CITY _____	ZIP _____
SCHOOL PHONE NUMBER _____	FAX NUMBER _____	
E-MAIL ADDRESS _____		
SUBJECTS TAUGHT _____		

SECTION IIA: Please answer the following questions completely.

1A. Identify what you consider to be the most important elements in working with students on a research topic.

2A. Describe an example of a research scenario/activity you have used in your classroom.

3A. Describe the use of technology in teaching and for other uses in your school/classroom.

4A. Describe the opportunities and support available in your school for using technology. Barriers?

5A. List any systemic change or teaching enrichment programs in which you have participated:

6A. Compose a short essay for each of the following and **attach** to completed application. Address the following areas:

1. commitment to science teaching,
2. commitment to students,
3. commitment to the school community,
4. commitment to pedagogical change.

SECTION IIIA:

List any experiences you have had in the following computer and software applications.

word processing software yes/no types:

spreadsheet software yes/no types:

database software yes/no types:

presentation software yes/no types:

communications software yes/no types:

type of computer used: Mac PC both

specifications: Model _____

RAM _____ HD size _____ processor _____

(example - iMac, RAM - 32 meg, HD size 4 Gig, processor 333mhz)

Section B - Administrator

SECTION IB: Demographic information

ADMINISTRATOR NAME _____		
HOME ADDRESS _____	CITY _____	ZIP _____
HOME PHONE NUMBER _____		
SCHOOL NAME _____	SCHOOL DISTRICT _____	
SCHOOL ADDRESS _____	CITY _____	ZIP _____
SCHOOL PHONE NUMBER _____	FAX NUMBER _____	
E-MAIL ADDRESS _____		

SECTION IIB:

Please answer the following questions completely.

1B. Identify what you consider to be the most important elements in working with teachers on a curriculum project.

2B. List any systemic change or teaching enrichment programs in which you have participated:

3B. Describe the use of technology in teaching and for other uses in your school.

4B. Describe the opportunities and support available in your school for using technology. Barriers?

5B. Compose a short essay for each of the following and attach to completed application. Address the following areas:

1. commitment to science teaching,
2. commitment to students,
3. commitment to the school community,
4. commitment to pedagogical change.

SECTION IIIB:

List any experiences you have had in the following computer and software applications.

word processing software yes/no types:

spreadsheet software yes/no types:

data base software yes/no types:

presentation software yes/no types:

communications software yes/no types:

type of computer used: Mac PC both

specifications: Model _____

RAM _____ HD size _____ processor _____

(example - iMac, RAM - 32 meg, HD size 4 Gig, processor 333mhz)

Section C

This section must be completed by both the applicant and the administrator.

If selected for participation in the LASSO project, we agree that the applicant will complete the program.

SIGNED: _____ DATE: _____
(teacher)

SIGNED: _____ DATE: _____
(administrator)

PLEASE RETURN THE COMPLETED TEACHER/ADMINISTRATOR APPLICATION FORM AND ALL ATTACHMENTS TO:

Deadline for Applications:
April 7, 2000

RICHARD ALEXANDER
LASSO Project Coordinator
Science Education Team
LOS ALAMOS NATIONAL LABORATORY
PO BOX 1663 MS M706
LOS ALAMOS, NM 87545
FAX (505)-665-4093

Application Process Checklist

Applications must be complete for consideration. Successful applicants will receive training in use of computer applications, web design, project presentations and display, and relevant science content. Each participant will also receive software and publications that will further their understanding of space physics, effective pedagogy and presentations skills. In addition, successful applicants will be eligible for a substantial follow-up award to be used to purchase personal computer hardware/software to enhance their integration of computer technology in the classroom.

Checklist:

- _____ I have read the introductory information about LASSO
- _____ I have discussed the program with my administrator
- _____ I will be able to attend all LASSO workshops (May 11-12, July 10-20, August 9-11)
- _____ I will be able to implement LASSO educational projects in my classroom
- _____ I am open to new ideas concerning the implementation of computer technology in the classroom
- _____ I have access to computer equipment
- _____ I have access to the Internet
- _____ I have completed the Teacher demographics - section IA
- _____ I have completed the questions – section IIA
- _____ I have attached the essays for section IIA
- _____ I have completed the computer specifications – section IIIA
- _____ I have given the application packet to my administrator to complete
- _____ My administrator has completed the Administrator demographics – section IB
- _____ My administrator has completed the questions – section IIB
- _____ My administrator has completed and attached the essays for section IIB
- _____ My administrator has completed the computer specification section – section IIIB
- _____ My administrator has signed and dated the application – section C
- _____ I have signed and dated the application – section C
- _____ The application has been completed and submitted before the April 7, 2000 deadline.